Washington State Department of Transportation
State Construction Office

RECYCLED CONCRETE USAGE IN AGGREGATE MATERIALS

2016 ANNUAL REPORT

February 14th, 2017

SUMMARY

Engrossed Substitute House Bill (ESHB) 1695 passed the Washington State Legislature in 2015. Section 3 of the Bill requires the Washington State Department of Transportation (WSDOT) to develop and establish objectives and strategies for the reuse and recycling of construction aggregate and recycled concrete materials. New language was added to RCW 70.95.805 that requires WSDOT to *"specify and annually use a minimum of twenty-five percent construction aggregate and recycled concrete materials on its cumulative transportation, roadway, street, highway and other transportation infrastructure projects"* unless construction aggregate and recycled concrete materials are not readily available or cost-effective. The Bill also required that "*The department of transportation and its implementation partners must collaboratively develop and establish objectives and strategies for the reuse and recycling of construction aggregate and recycled concrete materials."*

As a first step in addressing these requirements, WSDOT established a core group of implementation partners to assist with the effort. The implementation partners were carefully selected to ensure representation from all the key stakeholders affected by this legislation. The implementation team included the following individuals:

Scott Ayers – Graham Construction
Jimmy Blais – Gary Merlino Construction Company
Bruce Chattin – Washington Aggregate and Concrete Association
Susan Ellis – Federal Highway Administration
Dave Erickson – WSDOT State Construction Office
Michael Fleming – WSDOT State Construction Office
Bill Grady – KLB Construction Inc.
David Jones – WSDOT State Materials Laboratory
Greg Mckinnon – Stoneway Concrete
Rob Molohon – WSDOT State Materials Laboratory
David Mounts – WSDOT Local Programs
Will Smith – WSDOT South Central Region
Denys Tak – WSDOT State Construction Office

The implementation team engaged in a series of meetings in 2015 with the primary goal of identifying opportunities to use construction aggregate and recycled concrete materials on WSDOT projects and to develop contractual language to promote this use and meet the requirements of the Bill. The specific opportunities for reuse of these materials were included in this Bill through a reference to Table 9-03.21(1)E of the WSDOT Standard Specifications for Road, Bridge and Municipal Construction. A copy of this Table is provided below with the opportunities for the use of recycled concrete materials highlighted. There are 17 items identified as candidates for substitution of recycled concrete aggregate. Each of these items can be completely substituted (100%) with recycled concrete aggregate in lieu of the conventional native aggregates.

Table 1 -- 9-03.21(1)E Maximum Allowable Percent (By Weight) of Recycled Material

Maximum Allowable Percent (by weight) of Recycled Material					
		Hot Mix Asphalt	Recycled Concrete Aggregate	Recycled Glass (glass cullet)	Steel Slag
Fine Aggregate for Portland Cement Concrete	9-03.1(2)	0	0	0	0
Coarse Aggregates for Portland Cement Concrete	9-03.1(4)	0	0	0	0
Coarse Aggregate for Commercial Concrete	9-03.1(4)	0	100	0	0
Aggregates for Hot Mix Asphalt	9-03.8	See 5-04.2	0	0	20
Ballast	9-03.9(1)	25	100	20	20
Permeable Ballast	9-03.9(2)	25	100	20	20
Crushed Surfacing	9-03.9(3)	25	100	20	20
Aggregate for Gravel Base	9-03.10	25	100	20	20
Gravel Backfill for Foundations – Class A	9-03.12(1)A	25	100	20	20
Gravel Backfill for Foundations – Class B	9-03.12(1)B	25	100	20	20
Gravel Backfill for Walls	9-03.12(2)	0	100	20	20
Gravel Backfill for Pipe Zone Bedding	9-03.12(3)	0	100	20	20
Gravel Backfill for Drains	9-03.12(4)	0	0	20	0
Gravel Backfill for Drywells	9-03.12(5)	0	0	20	0
Backfill for Sand Drains	9-03.13	0	0	20	0
Sand Drainage Blanket	9-03.13(1)	0	0	20	0
Gravel Borrow	9-03.14(1)	25	100	20	20
Select Borrow	9-03.14(2)	25	100	20	20
Select Borrow (greater than 3 feet below Subgrade and side slopes)	9-03.14(2)	100	100	20	20
Common Borrow	9-03.14(3)	25	100	20	20
Common Borrow (greater than 3 feet below Subgrade and side slopes)	9-03.14(3)	100	100	20	20
Foundation Material Class A and Class B	9-03.17	0	100	20	20
Foundation Material Class C	9-03.18	0	100	20	20
Bank Run Gravel for Trench Backfill	9-03.19	25	100	20	20

In addition to reviewing and affirming this Table, the implementation team also developed contract specification language requiring a minimum 25% use of recycled concrete aggregate for the items in Table 9-03.21(1)E that allow the use of recycled concrete aggregate (e.g. the 17 highlighted items). Contractors are allowed to waive the 25 percent recycled concrete aggregate usage requirement when they can demonstrate that it will cost more to incorporate recycled concrete aggregate than to use non-recycled aggregate.

The specifications developed by the implementation team also require the Contractor to provide a *Recycled Materials Report* at the end of every project showing the total quantities of aggregate items placed and the quantities of recycled concrete aggregate used in each item. If the 25 percent minimum requirement is not achieved, the Contractor must submit a cost estimate for each eligible aggregate item showing that the cost with recycled concrete aggregate was greater than without recycled concrete aggregate.

These requirements were included in all WSDOT construction contracts advertised after January 4, 2016.

REPORTING

ESHB 1695 also added RCW 70.95.807, requiring WSDOT to report annually to the legislature on the implementation of RCW 70.95.805. WSDOT uses the Recycled Materials Reports submitted by Contractors to tabulate recycled concrete aggregate usage on our projects.

For this first reporting period, there was a limited set of data to review. The reasons for this include:

- Reporting was only done by the Contractor at Physical Completion of the project. There were a limited number of projects advertised after January 4th, 2016 that reached physical completion by December 31, 2016.
- Many of the projects during this reporting period were Hot Mix Asphalt paving projects without opportunities for using recycled concrete aggregate.
- Several reports were submitted at the end of the year but have not yet been reviewed and accepted by WSDOT. These projects were not included in this report but will be a part of the summary next year.

As of December 31, 2016, WSDOT has received and accepted 16 Recycled Materials Reports for calendar year 2016. Only two projects used materials listed in Standard Specifications Section 9-03.21(1)E as eligible for substitution with recycled concrete aggregates. A summary of WSDOT's 2016 recycled concrete aggregate usage is shown in *Table 2*.

Table 2 – Summary of Recycled Concrete Usage 16 WSDOT Contracts in 2016 (ESHB 1695)

Summary of Recycled Concrete Usage 16 WSDOT Contracts in 2016 (ESHB 1695)		
Material	**Contract Quantities (Tons)**	**Recycled Concrete Used (Tons)**
Coarse Aggregate for Commercial Concrete	0	0
Ballast	0	0
Permeable Ballast	0	0
Crushed Surfacing	2,138	0
Aggregate for Gravel Base	0	0
Gravel Backfill for Foundations	0	0
Gravel Backfill for Walls	0	0
Gravel Backfill for Pipe Zone Bedding	45	0
Gravel Borrow	0	0
Select Borrow	5,496	0
Common Borrow	0	0
Foundation Material Class A and Class B	0	0
Foundation material Class C	0	0
Bank Run Gravel for Trench Backfill	0	0
Total:	**7,679**	0

Information regarding individual contract eligibility, use of recycled concrete aggregate and reasons for not using recycled concrete aggregates is provided in *Table 3*. For the two projects that included materials eligible for incorporation of recycled concrete aggregate, both provided documentation demonstrating this would have been more expensive than using non-recycled materials.

Table 3 -- Contracts with Approved Recycled Material Reporting Forms, Calendar Year 2016

Contracts with Approved Recycled Material Reporting Forms Calendar Year 2016					
Contract	**Eligible for Recycled Concrete?**	**Eligible Aggregate Material**	**Contract Quantity (Tons)**	**Recycled Concrete Used (Tons)**	**Reason Recycled Concrete Not Used**
8839	No				
8857	No				
8878	Yes	Crushed Surfacing	41	0	More Costly
8864	No				
8902	No				
8879	No				
8880	No				
8892	No				
8903	No				
8914	No				
8919	No				
8934	Yes	Crushed Surfacing Gravel Backfill for Pipe Zone Bedding Select Borrow	2097 45 5496	0 0 0	More Costly More Costly More Costly
8935	No				
8939	No				
8963	No				
8967	No				

Total: 7679

CONCLUSION

While we saw no recycled concrete aggregate usage during this reporting period, we anticipate usage in future reporting periods. All 16 projects during this period were short-duration projects (advertised, constructed and closed-out in 2016). Only two of these projects had opportunities for the use of recycled concrete aggregates. Future reporting periods will capture longer-duration, multi-year projects with greater opportunities for the use of recycled concrete aggregates.